

What is claimed is:

1. A method of manufacturing a solid state image pick up device having microlenses, comprising:

forming a plurality of photosensing device arrays on a semiconductor substrate;

forming a plurality of microlenses on the semiconductor substrate on which the photosensing device arrays are formed; and

hardening the surfaces of the microlenses by irradiating light into the microlenses.

2. The method of claim 1, wherein, in irradiating light into the microlenses, light is irradiated into the microlenses until the pencil hardness of the microlenses reaches 7-10.

3. The method of claim 2, wherein the light is deep ultraviolet (DUV) rays.

4. The method of claim 1, wherein, in irradiating light into the microlenses, DUV rays having a bandwidth between 200 and 400 nm are irradiated into the microlenses so that an optical energy of between 600 and 1,000 mJ/cm² is supplied to the microlenses.

5. The method of claim 1, wherein the step of forming a plurality of photosensing device arrays on the semiconductor substrate comprises:

providing a semiconductor substrate, in which a plurality of light receiving regions and a plurality of charge transmitting regions are defined;

forming optical diodes in the respective light receiving regions;

forming charge transmission electrodes in the respective charge transmitting regions;

forming light shielding films so that the light receiving regions are exposed;

isolating the charge transmitting electrodes and the light shielding films from each other by an insulating film so that the charge transmission electrodes are insulated from the light shielding films;

forming pads on predetermined portions of the insulating film; and

forming first and second planarizing films in the resultant surface of the semiconductor substrate on which the pads are formed in order.

6. The method of claim 5, further comprising the step of forming color filters between the first and second planarizing films so as to correspond to the light receiving regions.

7. The method of claim 5, wherein the first and second planarizing films are formed of a transparent organic material.

8. The method of claim 1, wherein the step of forming the plurality of microlenses comprises:

forming a material for forming microlenses on the resultant surface of the semiconductor substrate;

forming a lens pattern by exposing and developing a predetermined portion of the material for forming the microlenses; and

forming microlenses by supplying thermal energy so that the surface of the lens pattern has a radius of curvature.

9. The method of claim 8, wherein the microlenses are formed so as to correspond to the respective light receiving regions.

10. The method of claim 9, wherein the material for forming the microlenses is a transparent organic material.

11. The method of claim 8, further comprising the step of irradiating UV rays between step of forming the lens pattern and step of supplying thermal energy to the lens pattern, in order to improve the transmissivity of the lens pattern.

12. The method of claim 11, wherein the energy of the irradiated UV rays is between 500 and 2,000 mJ/cm².

13. A method of manufacturing a solid state image pick up device having microlenses, comprising:

forming a plurality of photosensing device arrays on a semiconductor substrate;

forming a plurality of microlenses on the semiconductor substrate on which the photosensing device arrays are formed; and

hardening the surfaces of the microlenses by irradiating DUV rays into the microlenses;

wherein the DUV rays are irradiated into the microlenses until the pencil hardness of the microlenses reaches 7-10.

14. The method of claim 13, wherein, in irradiating the DUV rays into the microlenses, DUV rays having a bandwidth between 200 and 400 nm are irradiated into the microlenses so that an optical energy of between 600 and 1,000 mJ/cm² is supplied to the microlenses.

15. The method of claim 14, wherein the step of forming the photosensing device arrays comprises:

- providing a semiconductor substrate, in which a plurality of light receiving redundant regions and a plurality of charge transmitting regions are defined;
- forming optical diodes in the respective light receiving regions;
- forming charge transmission electrodes in the respective charge transmitting regions;
- forming light shielding films so that the light receiving regions are exposed;
- isolating the charge transmitting electrodes and the light shielding films from each other by an insulating film so that the charge transmission electrodes are insulated from the light shielding films;
- forming pads on predetermined portions of the insulating film; and
- forming first and second planarizing films in the resultant surface of the semiconductor substrate on which the pads are formed in order.

16. The method of claim 15, further comprising the step of forming color filters between the first and second planarizing films so as to correspond to the light receiving regions.

17. The method of claim 16, wherein the planarizing films are formed of a transparent organic material.

18. The method of claim 13, wherein the step of forming the microlens array comprises:

- forming a material for forming microlenses on the resultant surface of the semiconductor substrate;
- forming a lens pattern by exposing and developing a predetermined portion of the material for forming the microlenses; and

forming microlenses by supplying thermal energy so that the surface of the lens pattern has a radius of curvature.

19. The method of claim 18, wherein the microlenses are formed so as to correspond to the respective light receiving regions.

20. The method of claim 18, wherein the material for forming the microlenses is a transparent organic material.

21. The method of claim 18, further comprising the step of irradiating UV rays between step of forming the lens pattern and step of supplying thermal energy to the lens pattern, in order to improve the transmissivity of the lens pattern.

22. The method of claim 21, wherein the energy of the irradiated UV rays is between 500 and 2,000 mJ/cm².

2007-01-10 10:44:49